December 2, 2002

California Department of Water Resources
Office of Water Use Efficiency
1416 Ninth Street, Room 338
Sacramento, CA 95814
Attn: Ms. Marsha Prillwitz

RE: Grant Application For Financing Of Satellite-Activated Landscape Irrigation Controllers

Dear Ms. Prillwitz:

Victor Valley Water District is pleased to submit this water use efficiency grant application to your office. We believe that satellite-activated landscape irrigation controllers are truly the conservation tools of the future; however, the climate of the High Desert is radically different from that of either Orange County or Solano County where this type of controller has been tested. Victor Valley Water District would like to test the reliability and the efficacy of the controllers in our climate before any District sponsored advertising that encourages the use of aforementioned style of irrigation controllers is put in place.

Victor Valley Water District is also verifying the projected benefit-to-cost ratio used in the grant application with the thirty proposed satellite-activated irrigation controllers. We anticipate large savings in water use and lowered water bills with the more sophisticated controllers that will benefit both the District and the consumer.

Again, thank you for accepting our grant application. If you have any questions about the application, please call me at (760) 843-3141.

Sincerely,

Richard Zack, PE
Associate Engineer/Grant Writer

2003 Urban Water Conservation Program

Grant Application

Submitted by:

17185 Yuma Street
Victorville, CA 92392
(760) 245-6424

Richard Zack, PE
Associate Engineer/Grant Writer

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Application Part A

Project Description, Organizational, Financial and Legal Information

A-1 Urban Water Conservation Grant Application Cover Sheet

1. Applicant (Organization or affiliation): Victor Valley Water District
2. Project Title: ET Irrigation Controller Project

3. Person authorized to sign and submit proposal:

Name, Title	Richard Zack, Associate Engineer/Grant Writer
Mailing address	17185 Yuma Street, Victorville, CA 92392
Telephone	(760) 843-3141
Fax	(760) 245-9219
E-mail	rzack@vvwater.org

4. Contact person (if different):

Name, Title	Richard Zack, Associate Engineer/Grant Writer
Mailing address	17185 Yuma Street, Victorville, CA 92392
Telephone	(760) 843-3141
Fax	(760) 245-9219
E-mail	rzack@vvwater.org

5. Funds requested (dollar amount): $36,009.00
6. Applicant funds pledged (local cost share) (dollar amount): $3,600.00
7. Total project costs (dollar amount): $39,609.00

8. Estimated net water savings (acre-feet/year): 192
   Estimated total amount of water to be saved (acre-feet): 1,920
   Over 10 years 10

   Benefit/cost ratio of project for applicant: 2.49
   Estimated $/acre-feet of water to be saved: $4,894 / 192 = $25 AF/year
9. Project life (month/year to month/year): 5/2004 to 5/2007 3 years
10. State Assembly District where the project is to be conducted: 36th
11. State Senate District where the project is to be conducted: 17th
12. Congressional District(s) where the project is to be conducted: 40th
13. County where the project is to be conducted: San Bernardino
14. Do the actions in this application involve physical changes in land use, or potential future changes in land use?
    (a) Yes
    (if yes, complete the land use check list at http://www.calfed.water.ca.gov/adobe_pdf/Questionnaires_EC_Permits_LandUse.pdf and submit it with the proposal
    (b) No X

A-2 Application Signature Page

By signing below, the official declares the following:

The truthfulness of all representations in the application;

The individual signing the form is authorized to submit the application on behalf of the applicant;

The individual signing the form read and understood the conflict of interest and confidentiality section and waives any and all rights to privacy and confidentiality of the application on behalf of the applicant; and

The applicant will comply with all terms and conditions identified in this Application Package if selected for funding.

_____
Signature

Richard Zack, PE
Name

Associate Engineer/Grant Writer
Title

_____
Date

A-3 Application Checklist

Complete this checklist to confirm all sections of this application package have been completed.

Part A: Project Description, Organizational, Financial and Legal Information

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__X____A-5 Maps
__X____A-6 Statement of work, schedule
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__X____A-8 Qualification of applicant and cooperators
__X____A-9 Innovation
__X____A-10 Agency authority
__X____A-11 Operation and maintenance (O&M)

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__N/A__B-2 Project reports and previous studies
__N/A__B-3 Preliminary project plans and specifications
__N/A__B-4 Construction inspection plan

Part C: Plan for Environmental Documentation and Permitting

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__X____C-2 Permits, easements, licenses, acquisitions, and certifications
__X____C-3 Local land use plans
__X____C-4 Applicable legal requirements

Part D: Need for Project and Community Involvement

__X____D-1 Need for project
__X____D-2 Outreach, community involvement, support, opposition

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__X____E-2 Other project benefits

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__X____F-1 Net water savings
__X____F-2 Project budget and budget justification
__X____F-3 Economic efficiency

Appendix: Benefit/Cost Analysis Tables

__X____Tables 1; 2; 3; 4a, 4b, 4c, 4d; and 5

A-4 Description of Project

The project proposed by Victor Valley Water District is a study of the effectiveness of satellite-operated evapo-transpiration landscape irrigation controllers (ET Controllers) in the High Desert of California. The High Desert areas of California are not only affected by lack of rainfall but they are also affected by extremes in temperatures and hot dry winds. It is not unusual in the Victorville area for an afternoon temperature to be above 100°F and then fall below 40°F twelve hours later with a dry wind blowing the entire time.

One recent study of the ET Controllers funded by the Department of Water Resources for the Solano County Water Agency was in the more temperate Delta-Bay Area climate where the changes in temperature are not as great within any given 24-hour period as they are in the High Desert. Even though Solano County borders on the relatively dry Central and Sacramento Valleys of California, this area still receives more than five times the average rainfall of Victorville and the High Desert. (The area around Vacaville averages about 23-inches of rainfall per year compared to Victorville averaging about 4-inches per year.)

To achieve the largest immediate conservation gains and to test the relative efficacy of the ET Controllers, Victor Valley Water District will try to locate the proposed ET Controllers at a minimum of one local elementary school and the local high school, several high water-use commercial sites with the remainder going to multi and single family dwelling sites. The aggregate total landscape area put under ET Controllers will be at least 50-acres. Once the operational viability of the ET Controllers in the High Desert is verified, Victor Valley Water District will begin researching ways and means to install ET Controllers over large portions of the landscape served with District water.

Access to each ET Controller over the life of the project is very important in evaluating the success of the project in reducing water consumption. As a current incentive to schools, businesses, and residences in Victorville to accept one of the thirty ET Controllers and allow unlimited access to same, the District has budgeted some grant funds for temporary easements and/or access licenses to enter the various properties where the installation has occurred. The amount of this incentive, in the form of a billing credit or rebate, is still under debate but the District staff is leaning toward a lump sum equal to the satellite communication fee for each ET Controller installed. A typical satellite communication fee is four dollars per month per unit over ten years as shown in Table 1, Line Item “a”.

In this grant-funded water conservation effort, Victor Valley Water District will be evaluating several brands of ET Controllers. As a general rule, most brands of ET Controllers have features that may preclude their use at one type of site but those same features may mean that a particular brand is the brand of choice for another site. Victor Valley Water District will pre-evaluate each ET Controller prior to installation so the ET

Controller for a given site is the best possible match. As an example, an ET Controller with the ability to control twenty-four landscape irrigation stations and operate eight stations simultaneously with different irrigation times would be ideal for a large commercial site or a school site but would be inappropriate for a single family residence.

In several studies referenced in the California Irrigation Management Information System Urban Resource Book (CIMIS), a thirty percent or greater reduction in landscape water use is possible (City of Freemont, Escondido Union School District, et al). **Ultimately, Victor Valley Water District hopes to gain enough knowledge about the benefits-to-costs of ET Controllers to offer billing credits or rebates to its customers who install these water-conserving devices in the future.**

A-5 Maps for Construction Projects

The enclosed USGS quadrangle map shows the location of the four potential evapo-transpiration controller sites within the boundaries of Victor Valley Water District. (See Map packet in the Appendix).

A-6 Statement of Work

Victor Valley Water District is proposing to install evapo-transpiration controllers (ET Controllers) at known high water-use locations and at typical residences within the District. Consultants that are experienced in landscape irrigation technology will do the actual installation of the ET Controllers. It is anticipated that the installation of the thirty ET Controllers will take less than a month with the controllers themselves lasting at least ten years without repairs or replacement.

General Work Schedule

TASKS	START DATE	COMPLETE DATE
Grant Application Submittal	----------	December 3, 2002
Pick 30 potential ET Controller sites using water use and billing records	January 13, 2003	February 28, 2003
Victor Valley Water District attorney to review "property entrance request letter"	February 28, 2003	March 19, 2003
DWR Funding Decision Announcement	----------	April 23, 2003
Contact owners of sites selected for ET Controllers	April 24, 2003	April 27, 2003
V. V.W.D. contact and interview suppliers of ET Controllers	April 24, 2002	May 6, 2002
Prepare contract RFP based on	May 22, 2003	July 24, 2003

TASKS	START DATE	COMPLETE DATE
interviews with ET Controller suppliers.		
Present Resolution to Board of Directors Authorizing General Manager to Accept grant funds	October 14, 2003	October 14, 2003
Present Urban Water Conservation Program grant contract to Board of Directors for approval.	November 19, 2003	November 19, 2003
Advertise Contract for ET Controller Installation Work	January 6, 2004	January 20, 2004
Let Contract for formal bid on ET Controller Installation	February 4, 2004	February 11, 2004
Close bidding for the installation of ET Controllers	February 11, 2004	February 11, 2004
Low bidder notified and contract taken to Board of Directors for approval	February 17, 2004	February 17, 2004
Field installation of ET Controllers	March 4, 2004	April 2, 2004
Technical adjustments of the ET Controllers	April 3, 2004	April 24, 2004
Begin record keeping on ET Controller activity at each site	May 1, 2004	May 1, 2007
First ET Controller Quarterly Use Rate Report due at DWR*	----------	September 1, 2004
Second ET Controller Quarterly Use Rate Report Due at DWR	----------	December 1, 2004
Third ET Controller Quarterly Use Rate Report Due at DWR	----------	February 1, 2004
Fourth ET Controller Quarterly Use Rate Report Due at DWR	----------	May 1, 2004
Second Operational Year Report Due at DWR	----------	May 1, 2005
Third Operational Year Report Due at DWR	----------	May 1, 2006

* A typical summer in Victorville will have many days above 105°F with the humidity at less than 20%. The First Quarterly Report may show immediately how well ET Controllers will work in an extremely hot and dry environment. If the ET Controllers fully meet the conservation and operational expectations during the first year, then Victor Valley Water District may choose to have its irrigation consultant or engineering firm that is familiar with the ET Controller technology begin writing its analysis of the ET Controllers' efficacy without waiting on the following years' data collection.

A-7 Monitoring and Evaluation

The monitoring and evaluation of the evapo-transpiration controllers (ET Controllers) will begin immediately upon installation. Since the ET Controllers are essentially an ultra-sophisticated sprinkler timer, the early results of the various site installations will be visible within a few days of installation. The meter-readers will check the sites with ET Controllers as part of their respective routes, looking for puddles and/or dying spots in lawns.

Even though the meter-readers' observations will be casual and to a large extent unscientific, their reports will give the installation consultants feedback on what ET Controllers need to be readjusted. The early adjustment of the ET Controllers will result in the longest period of accurate water use records for a given ET Controller. It is anticipated that improvements in satellite meteorology and in the California Irrigation Management Information System (CIMIS) will necessitate incidental adjustments at a later date to the ET Controllers by the installation consultants.

As the meters are read each month, the Victor Valley Water District data processing staff will soon be able to spot water use trends at each site with an ET Controller. The current water use records at Victor Valley Water District go back three years so conservation trends and lower billings will be easy to spot. It should be noted that the ET Controllers will be installed just prior to the summer months so maximum water savings will be evident in the first month or two of use.

The water use data reflected in the meter readings and the subsequent billings will be the basis for each quarterly report to be submitted to DWR by Victor Valley Water District. Since it is anticipated that each site with an ET Controller will experience a sharp drop in water use for the first year of operation with little change thereafter, Victor Valley Water District will provide quarterly reports to DWR about its ET Controller project. Years two and three of the project will in all probability be repeats of the first year's conservation and savings effort; therefore, with the Department of Water Resources' permission, Victor Valley Water District will provide annual reports noting both the water conserved and the reduction in the customers' billing without the intervening quarterly reports.

ET Controllers are **the** irrigation tools of the future. Victor Valley Water District will be hiring an irrigation consultant or an engineering firm that is familiar with ET Controllers to analyze the results of the ET Controller data gained at each test site. This report will be submitted to the Department of Water Resources in addition to the in-house

monitoring reports required by the grant application. Other recipients of this report will be the local news media, AWWARF, CAL-FED headquarters, etc.

A-8 Qualifications of the Applicant and Cooperators

Please see Appendix for qualifications of Applicant and Cooperators.

A-9 Innovation

Evapo-transpiration irrigation technology is truly the wave of the future in California. By having satellite meteorology analyze weather data and subsequently control landscape irrigation practices, water conservation can be achieved in the most consumer-friendly way possible: write the monthly check to the evapo-transpiration controller (ET Controller) company and forget about ever having to water the lawn and landscaping again. The use of the California Irrigation Management Information System (CIMIS) data now and in the future will enhance the efficacy of the ET Controllers.

Victorville, California is unique in that it has temperature extremes as well as hot dry winds that most areas of the State do not have. Due to these harsh weather conditions Victor Valley Water District will be installing thirty ET Controllers as a test for both the unit's efficiency at conserving water and their reliability in the High Desert climate.

We will also be surveying people's attitudes toward the ET Controllers once they are installed. We suspect that this user-friendly, water-saving "appliance" will be a definite hit with the desert dwellers that want to conserve water and lower their monthly water bills. Not only will the ET Controllers automatically avoid the problems associated with over-watering, such as soggy yards and larger water bills, the ET Controllers will eliminate time wasted in Spring and Fall re-programming existing landscape irrigation controllers.

One of the more unusual benefits to be gained by using ET Controllers is vector control. Even though rainfall is typically light and infrequent on the High Desert at Victorville, conventional landscape watering practices often leave puddles in which the larvae from the mosquitoes carrying the West Nile Virus develop. It is believed that widespread use of ET Controllers will virtually eliminate areas of standing water in and around homes, schools, and various commercial establishments thereby reducing the problems associated with vector control.

A-10 Agency Authority

1) Richard Zack, PE is the grant writer for Victor Valley Water District. The title of his position is Associate Engineer/Grant Writer. Mr. Zack has been authorized by the General Manager and/or the District Engineer to submit

grant applications in behalf of the District. In the past, Mr. Zack has submitted grant applications to the California Energy Commission and the United States Environmental Protection Agency as well as to the California Department of Water Resources.

_____

Reginald Lamson, RCE 43,681 Date

2) The applicant for the Urban Water Conservation grant is Victor Valley Water District, formed on the 25th day of January 1932. Please see a copy of the original formation documents in the appendix.
3) Is the applicant required to hold an election before entering into a funding contract with the State? **No.**
4) Will the funding agreement between the applicant and the State be subject to review and/or approval by other governmental agencies? **No.**
5) Is there any pending litigation that may impact the financial condition of the applicant, the operation of the water facilities, or its ability to complete the proposed project? **There is no litigation pending.**

A-11 Operations and Maintenance

The establishment of thirty evapo-transpiration landscape irrigation controllers (ET Controllers) within the City of Victorville is not a construction project, and as such, will have few operations and maintenance costs associated with it after the initial ET Controller installation. There is a possibility that as satellite meteorology improves, some or all of the units will need adjustment but most of those costs will be part of the initial installation price.

Application Part B

Engineering and Hydrologic Feasibility

B-1 Certification Statement

This is not a construction project; therefore, Engineering and Hydrologic feasibility studies, plans, etc. are not required.

Application Part C

Plan for Completion of Environmental Documentation and Permitting Requirements

C-1 California Environmental Quality Act and National Environmental Policy Act

Following the general guidelines in the instructions for Part C, "…if this project is not subject to CEQA or NEPA, so state in this section."

Victor Valley Water District's proposed project of replacing thirty existing landscape irrigation controllers with more sophisticated weather satellite-activated evapo-transpiration controllers requires no permits and is exempt from CEQA/NEPA regulation.

C-2 Permits, Easements, Licenses, Acquisitions, and Certifications

No Federal, State, or local permits, per se, will be required for this project. To install and monitor evapo-transpiration irrigation controllers (ET Controllers), Victor Valley Water District may have to purchase, through billing credits and/or rebates, temporary access easements or access licenses from private and public entities. It is anticipated that the ET Controllers placed on property owned by the Burlington Northern Santa Fe (BNSF) railroad will require access through a railroad issued right-of-entry permit.

At the time of this grant application the entire list of potential ET Controller sites has not been completely developed; however, several schools and businesses have been "targeted" due to their potential to generate huge water savings by using ET Controllers.

C-3 Local Land Use Plans

The exchanging of existing landscape irrigation controllers with the more technologically advanced weather-satellite activated evapo-transpiration irrigation controllers (ET Controllers) does not require changes in the local zoning or City General Plans. No authorization from any governmental body is required for this change in landscape irrigation technique.

C-4 Applicable Legal Requirements

All known, Federal, State, or local laws do not affect the exchange of landscape irrigation controllers of one type for another.

Application Part D

Need for Project and Community Involvement

D-1 Need for the Project

Victor Valley Water District, located in the High Desert of California, is totally dependent upon groundwater to supply its customers. The basin from which the District draws its water has been in over-draft for approximately fifty years, with the rate of over-draft increasing with time. (See Appendix) There are currently no substitute supplies for the groundwater used by Victor Valley Water District.

If the groundwater supply runs out and the District has to buy water from the Mojave Water Agency or from the State Water Project at the East Branch of the California Aqueduct, then the water billing rates will raise considerably to pay for pipelines and new treatment plants. It should be noted that confiscatory water billing rates typically drive industry away from a community thereby creating unemployment and blight. Consumer-friendly, easy-to-use water conservation measures will assist the District in avoiding water purchases and their related expenses for decades to come.

If we lose our groundwater supply with the alternative source of water being State Water Project water from the California Aqueduct, then our water needs will become at odds with the CAL-FED ROD.

The available literature indicates that reduction of outdoor water use is one of the most efficient and consumer-friendly ways to conserve water. In an effort to conserve its dwindling water supply, Victor Valley Water District is applying for grant funding to confirm the efficiency of evapo-transpiration irrigation controllers (ET Controllers) in a desert environment where there are daily as well as yearly extremes in temperature.

It is anticipated that by installing thirty ET Controllers, the District will be able to conserve approximately 192 acre-feet of water per year. Another aspect of the trial use of thirty ET Controllers will be to check the reliability of the ET Controllers in the Victorville environment with its extreme temperature fluctuations (40° F to 100+°F in 24-hours) and its hot dry winds. Obviously, the summers are very hot in the High Desert; but surprisingly, it also snows several times per year!

By carefully monitoring the water use after the installation of the ET Controllers and the checking the innate reliability of a satellite-controlled irrigation timer, Victor Valley Water District will be able to project both a water savings and a cost savings related to ET Controller use. These two savings will allow the District to better predict the amount of rebates or billing credits to offer its customers at a later date for installing an ET Controller.

D-2 Outreach, Community Involvement, Support, Opposition

As the letters in the Appendix indicate, we are attempting to contact the local school officials and businesses to establish trial areas for using the evapo-transpiration irrigation controllers (ET Controllers). Some of the larger, out-of-town businesses, such are Burlington Northern Santa Fe (BNSF) Railroad and Verizon may be somewhat more difficult contact but the potential for water conservation on their respective properties is great. As a general rule, school systems and businesses are always in favor of a direct money saving technology, especially when the technology is purchased and supplied by others, in this case, ET Controllers supplied by Victor Valley Water District.

As with all technological advancements, the widespread use ET Controllers will create jobs within the private sector. The exact number of jobs and the type of jobs created are unknown; however, it is anticipated that the work created by using ET Controller technology will be high-end electronic repair and computer programming jobs. Training in both of these job categories is currently offered in night and day classes at Victor Valley Community College. (See Appendix) Victor Valley Water District is fortunate that local people can assist in the technical aspects of the District's conservation efforts.

Conservation also keeps water rates low so businesses want to stay in the High Desert. The ET Controller is a very efficient tool to use in reaching that goal.

When the notification of the acceptance of our grant proposal arrives, Victor Valley Water District will begin an advertising campaign using billing stuffers and our other water awareness tools to generate public interest in the installation of ET Controllers in private residences. The Appendix includes a recent copy of *The Water Resource*, a monthly publication by Victor Valley Water District, where the advantages of ET Controllers will be heavily discussed.

Application Part E

Water Use Efficiency Improvements and Other Benefits

E-1 Water Use Efficiency

Victor Valley Water District is totally dependent on an ever-dwindling source of groundwater called the Mojave Basin. (See Appendix) Many sources indicate that landscape watering accounts for more than fifty percent of the water use in a given area. By watering landscape areas within the District more efficiently, the rate of over-draft within the Mojave Basin will slow. The biggest landscape water users within the District will be approached first for the use of evapo-transpiration irrigation technology (ET Controllers). The free installation of ET Controllers at selected sites along with the water consumer's ability to save money on water billings will make ET Controllers a popular conservation tool.

The calculations included in F-1 in this grant application show that potentially almost 200 acre-feet of water can be conserved with the use of thirty ET Controllers. Once the ET Controllers are more widespread in the District the conservation effort could easily exceed 1,000 acre-feet per year.

The immediate consumer benefit of ET Controllers regardless of the site location is reduced water bills; the immediate District benefit of ET Controllers is the lessening of the need for the development of expensive surface water supplies. The staff at the District realizes that going from a groundwater source that receives a minimal dose of chlorine at the wellhead to the full water treatment facilities required for surface water will be a tremendous expense for all consumers to bear.

E-2 Other Project Benefits

Even though the largest benefit to the use of evapo-transpiration irrigation controllers (ET Controllers) goes to Victor Valley Water District in the form of water conservation, a concurrent benefit is the conservation of State Water Project water. Any postponement or significant reduction in the use of State Water Project surface water clearly advances the objectives of CALFED.

The projected savings through the use of ET Controllers for water conservation is almost two hundred acre-feet per year. By conserving our relatively high quality groundwater now, Victor Valley Water District can delay or completely avoid the major capital costs of a surface water treatment plant in the future. Our conservation efforts will also help the District avoid the cost and the public relations nightmare of the construction of five to ten miles of transmission pipeline through the City of Hesperia, which is not served by Victor Valley Water District.

The aforementioned savings will not only benefit the CALFED objectives but the wide spread use of ET Controllers will also advance the conservation efforts of the California Energy Commission. Even though the percent of savings may be small, any reduction in the electricity used at the A.D. Edmonston, Pyramid Lake, and Pearblossom Pumping Stations is a benefit to all consumers statewide.

By avoiding the use of imported water from State Water Project facilities, the potential for increasing the total dissolved solids (TDS) loadings within the Mojave Basin is greatly reduced. There is also a chance that imported water could percolate into the existing supplies and destabilize one mineral element or another, creating even more water treatment costs to remove the newly formed noxious chemicals.

As mentioned earlier in the grant application, a tighter control on landscape watering with ET Controllers will reduce the amount of run-off and standing water around the office, home, or school campus. This reduction in standing water greatly enhances Vector Control personnel's ability to combat mosquitoes that carry deadly the West Nile Virus and other forms of encephalitis.

ET Controllers also greatly lessen the chance of over-watering. Over-watering not only creates unhealthy plant and shrubs, it also allows run-off from lawns and flowerbeds to reach the storm drains. This run-off is often laden with toxic chemical residues from fertilizers, insecticides and herbicides that eventually reach rivers and other surface water sources. The use of ET Controllers will help eliminate the transference of chemical residues through run-off.

There are many benefits to the consumer-friendly ET Controllers beyond just the dollar amount "bottom line" and a common-sense good way to conserve water.

Application Part F

Economic Justification: Benefits the Costs

F-1 Net Water Savings

Victor Valley Water District serves the High Desert community of Victorville. This community is situated in a climate where extremes in temperature, often coupled with high dry winds, makes landscape irrigation watering a nightmare. The summer days often are above 105°F with a 20-mile per hour wind exacerbating normal evapo-transpiration problems in landscape irrigation; six months later the wind is still blowing in the winter but there may be snow on the ground with the temperature below freezing in the high twenties. This environment may be the perfect place for evapo-transpiration irrigation controllers (ET Controllers) even though all of the studies on ET Controllers occur in more temperate areas.

The calculation below, based on known facts about landscape irrigation water use in Victorville, indicates that at least 192 acre-feet of water can be saved in one year. Even though the Irvine Ranch Water District study predicts a 24% reduction in outdoor water use, the climate around Victorville suggests that a much higher reduction percentage is probable; the calculations below use a very conservative 30% reduction factor.

Water use and reduction calculations are based on water use derived from actual billings from the year 2001-2002. The calculation follows:

11/18/2002 Water Usage Calculations Urban Water Conservation Program

Victorville High School 2 ball fields w/ 4" meters

Football Field Usage in 2001-2002
12,264 CCF or ~~9,173,472~~ Gals
Say 9,173,500 Gals

$$9{,}173{,}500 \text{ Gals} \times \frac{1 \text{ AF}}{325{,}830 \text{ Gals}} = 28.2 \text{ AF}$$

Baseball Field Usage in 2001-2002
20,782 CCF or ~~15,544,936~~ Gals
Say 15,544,950 Gals

$$15{,}544{,}950 \text{ Gals} \times \frac{1 \text{ AF}}{325{,}830 \text{ Gals}} = 47.7 \text{ AF}$$

An Elementary School in Victorville Play fields w/ 3" meters

Play Field Usage in 2001-2002
8,970 CCF or 6,709,560 Gals

$$6{,}709{,}560 \text{ Gals} \times \frac{1 \text{ AF}}{325{,}830 \text{ Gals}} = 20.6 \text{ AF}$$

A Utility Corporations Landscape Area — Approx. 3 acres of landscape w/ 8" meter

Landscape Usage in 2001-2002
24,436 CCF or ~~18,278,128~~ Gals
Say: 18,278,130 Gals

$$18{,}278{,}130 \text{ Gals} \times \frac{1 \text{ AF}}{325{,}830 \text{ Gals}} = 56.1 \text{ AF}$$

Average of Six Residences in Victorville — Lot sizes vary but all have _" meters

12 month Average 2001-2002 for 6 Residences – 462.8 CCF/Residence
46,280 FT^3/Residence or 346,174 Gals/Residence
346,200 Gals or 1.1 AF/ Residence

Total Water Used by one high school, one elementary school, one utility corporate office complex and three residences:

(47.7 AF) + (20.6 AF) + (56.1 AF) + 3(1.1 AF) = 127.7 AF; Say 128 AF

Estimated Total Water Used in 10 years: (10 years) (128 AF) = 1,280 AF

Water saved if ET Controllers save 30% in 10 years: (0.30)(1280 AF) = 384 AF saved in 10 years. This equals 125,118,720 gallons in 10 years.

District Water Costs Per Gallon: (From 2001-2002 Budget)

$$\frac{\$7{,}812{,}696}{5{,}533{,}879{,}736 \text{ Gals}} = \$0.00141 \text{ per gallon}$$

District's 10-Year Cost Savings without Inflation:
($0.00141/gal)(125,118,720 gal) = $176,417 saved.

For a mix of schools, industry and residences totaling 30 statistically relevant locations:

$$\frac{128 \text{ AF}}{6} = \frac{x}{30} \longrightarrow X = 640 \text{ AF Used}$$

Savings at 30 typical Locations at 30%:

0.30 X 640 AF = 192 AF saved in one (1) year.

F-2 Project Budget and Budget Justification

This budget is based on the assumption that until a market demand is created by word-of-mouth advertising, newspaper articles, and service club speaking engagements, Victor Valley Water District will have to provide the first "nudge" in the High Desert for evapo-transpiration irrigation controllers (ET Controllers). Future fiscal years will provide adequate funding for various public education efforts.

Budget Table 1, Line Item "a" is requested from the Department of Water Resources to "purchase" easements to access the ET Controllers once they are installed. These easements allow District personnel and consultants to check on the ET Controllers for correct operation and to gather data for subsequent reporting to the Department of Water Resources, Division of Planning and Local Assistance.

The staff at the District also feels that the access easement purchase is the first step in establishing a good relationship with the businesses and the homeowners who will be experiencing a minor disruption for the installation of the ET Controllers. Even though this "purchase" will be in the form of billing credits or rebates, the district anticipates that a billing credit or rebate that just equals the monthly satellite service fee may be an inducement for some customers to try out the ET Controllers. The District is convinced that the customers will be discussing the convenience of the ET Controllers as well as the financial savings each month. Once the demand is created for the ET Controllers, Victor Valley Water District will consider offering billing credits or rebates to the homeowners who install ET Controllers in the future. The cost of the access easement may average at $480 per ET Controller depending on the amount of potential savings at a given site. Budget Table 1, Line Item "a" is a very important part of the budget for the success of the program.

Table 1, Line Item "b" is requested from the Department of Water to fund outside consultants that have expertise in the installation of ET Controllers and other consultants to write a report on the success of the ET Controllers based on the District's billing and water use records. It has been recommended by one of the firms manufacturing ET Controllers that an expert in ET Controller installation be hired to save time and public relations problems. Again, having data that can be shared with many population groups is the purpose of having an outside consultant write a report that can be submitted to the local news media, AWWARF, ASCE, etc. There may be some overlap of Budget Table 1, Line Item "b" with that of Budget Table 1, Line Item "c" during the course of the ET Controller installation (e.g., The "planning part" of Line Item "b" will clearly influence the needs of the "installation part" of Line Item "c".)

Budget Table 1, Line Item "c" is based on the median cost of the ET Controllers as they were quoted from various suppliers (e.g. WeatherTRAK at $200 plus shipping, etc. with installation extra). Victor Valley Water District desperately needs the requested thirty ET Controllers to begin a major water conservation effort.

Victor Valley Water District
Grant Budget Table 1

Line Item	Requested Item	Quantity	Estimated Unit Price	Amount Requested in Grant Application
a	Access Easements	30	$481.33	$14,440.00
b	Planning and Engineering	----------	Lump Sum	$10,000.00
c	ET Controllers	30	$250.00	$7,500.00
Grand Total of Expenditures without contingency				$31, 940.00
Set Average Contingency at 12.75%				$4,073.00
Budget with Contingency Included				$36,013.00

General Fund Monies Budget For ET Controllers

Victor Valley Water District will budget $3,600 for advertising and miscellaneous expenses related to the ET Controller project.

November 13, 2002

Mr. Ralph Baker, Superintendent
Victor Elementary School District
15579 Eighth Street
Victorville, CA 92392-3262

RE: Consider Elementary School Site To Test An Evapo-Transpiration Irrigation System Controller

Dear Mr. Baker:

In an effort to expand its water conservation practices, Victor Valley Water District is applying for grant funding to study the benefits and cost reductions of electronically controlled landscape watering. Studies done in Northern California indicate that evapo-transpiration landscape irrigation controllers (ET controllers) are very efficient at reducing water usage and lowering water bills; however, the climate of Northern California is radically different from that of the High Desert.

Victor Valley Water District is proposing, using grant funding, for which we will apply, to replace an existing landscape irrigation controller with a new ET controller at an elementary school campus that has a large lawn area. The District would install the ET controller and monitor its effectiveness in lowering both the campus' water usage and the school's water bill. It should also be noted that the new ET controller is a permanent installation and will remain at the school after our study is completed.

Thank you for considering our request to install an ET controller at an elementary school after we receive our grant funds. If you have any questions about the proposed ET controllers and our need to test the ET controllers, please call me at (760) 843-3141.

Sincerely,

Richard Zack, PE
Associate Engineer/Grant Writer

cc: Rhonda Moon, Victor Elementary School District

November 25, 2002

Ms. Joan Williams
Burlington Northern Santa Fe
P.O. Box 650439
Dallas, TX 75265

RE: Consider Railroad-Owned Site To Test An Evapo-Transpiration Irrigation System Controller

Dear Ms. Williams:

In an effort to expand its water conservation practices, Victor Valley Water District is applying for grant funding to study the benefits and cost reductions of electronically controlled landscape watering. Studies done in Northern California indicate that evapo-transpiration landscape irrigation controllers (ET controllers) are very efficient at reducing water usage and lowering water bills; however, the climate of Northern California is radically different from that of the High Desert.

Victor Valley Water District is proposing, using grant funding, for which we will apply, to replace an existing landscape irrigation controller with a new ET controller at a railroad site that has a large lawn area. The District would install the ET controller and monitor its effectiveness in lowering both the site's water usage and the railroad's water bill. It should also be noted that the new ET controller is a permanent installation and will remain at the site after our study is completed.

Thank you for considering our request to install an ET controller at a one of the railroad's landscaped sites after we receive our grant funds. If you have any questions about the proposed ET controllers and our need to test the ET controllers on site, please call me at (760) 843-3141.

Sincerely,

Richard Zack, PE
Associate Engineer/Grant Writer

November 25, 2002

Verizon Administrative Offices
Mr. Bill Neece, Supervisor of Real Estate
One G T E Place
Thousand Oaks, CA

RE: Consider Verizon-Owned Site To Test An Evapo-Transpiration Irrigation System Controller

Dear Mr. Neece:

In an effort to expand its water conservation practices, Victor Valley Water District is applying for grant funding to study the benefits and cost reductions of satellite-controlled landscape watering. Studies done in Northern California indicate that evapo-transpiration landscape irrigation controllers (ET controllers) are very efficient at reducing water usage and lowering water bills; however, the climate of Northern California is radically different from that of the High Desert.

Victor Valley Water District is proposing, using grant funding, for which we will apply, to replace an existing landscape irrigation controller with new satellite-controlled ET controllers at the Verizon Business Complex located at the following addresses:

15168 to 16701 La Paz Drive
Victorville, CA 92392

The District would install the ET controllers and monitor their effectiveness in lowering both the Complex's water usage and Verizon's water bill. It should also be noted that the new ET controller is a permanent installation and will remain at the site after our study is completed.

Thank you for considering our request to install ET controllers at a one of Verizon's landscaped sites after we receive our grant funds. If you have any questions about the proposed ET controller and our need to test the ET controllers on site, please call me at (760) 843-3141.

Sincerely,

Richard Zack, PE
Associate Engineer/Grant Writer

November 25, 2002

Dr. Patricia A. Mark, Superintendent
Victor Valley Union High School District
16350 Mojave Drive
Victorville, CA 92392

RE: Consider High School Site To Test An Evapo-Transpiration Irrigation System Controller

Dear Dr. Mark:

In an effort to expand its water conservation practices, Victor Valley Water District is applying for grant funding to study the benefits and cost reductions of satellite-controlled landscape watering. Studies done in Northern California indicate that evapo-transpiration landscape irrigation controllers (ET controllers) are very efficient at reducing water usage and lowering water bills; however, the climate of Northern California is radically different from that of the High Desert.

Victor Valley Water District is proposing, using grant funding, for which we will apply, to replace existing landscape irrigation controllers with new satellite-controlled ET controllers at the high school campus' ball fields. The District would install the ET controllers and monitor their effectiveness in lowering both the campus' water usage and the school's water bill. It should also be noted that the new ET controller is a permanent installation and will remain at the school after our study is completed.

Thank you for considering our request to install ET controllers at the high school ball fields after we receive our grant funds. If you have any questions about the proposed ET controllers and our need to test the ET controllers, please call me at (760) 843-3141.

Sincerely,

Richard Zack, PE
Associate Engineer/Grant Writer

Appendix

Benefit/Cost Analysis Tables

Applicant: Victor Valley Water District

THE TABLES ARE FORMATTED WITH FORMULAS: FILL IN THE SHADED AREAS ONLY

Table 1: Capital Costs

	Capital Cost Category (a)	Cost (b)	Contingency Percent (c)	Contingency $ (d) (bxc)	Subtotal (e) (b+d)
(a)	Land Purchase/Easements for Access	14,440	10.00%	1,444	15,884
(b)	Planning/Design/Engineering	10,000	15.00%	1,500	11,500
(c)	Materials/Installation	7,500	15.00%	1,125	8,625
(d)	Structures			0	0
(e)	Equipment Purchases/Rentals			0	0
(f)	Environmental Mitigation/Enhancement			0	0
(g)	Construction/Administration/Overhead			0	0
(h)	Project Legal/License Fees			0	0
(i)	Other			0	0
(j)	Total (1) (a + ... + i)				36,009
(k)	Capital Recovery Factor: Use Table 6				0.1359
(l)	Annual Capital Costs (j x k)				4,894

(1) Costs must match Project Budget prepared in Section F-2.

Table 2: Annual Operations and Maintenance Costs

Administration (a)	Operations (b)	Maintenance (c)	Other (d)	Total (e)
2,000	600			2,600

Table 3: Total Annual Costs

Annual Capital Costs (1) *(a)*	Annual O&M Costs (2) *(b)*	Total Annual Costs *(c)* *(a+b)*
4,894	2,600	7,494

(1) From Table 1, line (l)

(2) From Table 2, column *(e)*

Table 4: Water Supply Benefits

(2002 Dollars)

Net water savings (acre-feet/year)

191

4a. Avoided Costs of Current Supply Sources

Sources of Supply (a)	Cost of Water ($/AF) (b)	Annual Displaced Water Supply (AF) (c)	Annual Avoided Costs ($) (d) (b x c)
V.V.W.D. Wells	84.37	191	16114.67
			0
			0
			0
			0
Total			**16114.67**

4b. Alternative Costs of Future Supply Sources

Future Supply Sources (a)	Total Capital Costs ($) (b)	Capital Recovery Factor (1) (c)	Annual Capital Costs ($) (d) (bxc)	Annual O&M Costs ($) (e)	Total Annual Costs ($) (f) (d+e)
MWD Treated Water	431	0.1359	59	1,200	1,259
Treated Local Water	503	0.1359	68	1,200	1,268
			0		0
			0		0
			0		0
Total					**2,527**

(1) Use number from Capital Recovery Factor Table 6

4c. Water Supplier Revenue (Vendability)

Parties Purchasing Project Supplies (a)	Amount of Water to be Sold (AF) (b)	Selling Price ($/AF) (c)	Expected Frequency of Sales (1) (%) (d)	Expected Selling Price ($/AF) (e) (cxd)	"Option" Fee (2) ($/AF) (f)	Total Selling Price ($/AF) (g) (e+f)	Annual Expected Water Sale Revenue ($) (h) (b x g)
				0	0	0	0
				0		0	0
				0		0	0
				0		0	0
				0		0	0
Total							**0**

1) During the analysis period, what percentage of years are water sales expected to occur? For example, if water will only be sold half of the years, enter 50% (0.5).

2) "Option" fees are paid by a contracting agency to maintain the right of the contracting agency to buy water whenever needed. Although the water may not be purchased every year, the fee is usually paid every year.

Table 4d. Total Water Supply Benefits

(a) **Annual Avoided Costs of Current Supply Sources from 4a, column *(d)***	16,115
(b) **Annual Avoided Costs of Alternative Future Supply Sources from 4b, column *(f)***	2,527
(c) **Annual Expected Water Sale Revenue from 4c, column *(h)***	0
(d) **Total Net Annual Water Supply Benefit ($)** (a+b+c)	18,642

Table 5: Benefit/Cost Ratio

Project Benefits ($)(1)	18,642
Project Costs ($)(2)	7,494
Benefit/Cost Ratio	2.49

(1) From Table 4d, row (d): Total Annual Water Supply Benefits
(2) From Table 3. column *(c)*: Total Annual Costs

Table 6: Capital Recovery Table

Life of Project (in years)	Capital Recovery Factor
7	0.1791
8	0.1610
9	0.1470
10	0.1359
11	0.1268
12	0.1193
13	0.1130
14	0.1076
15	0.1030
16	0.0990
17	0.0954
18	0.0924
19	0.0896
20	0.0872

Life of Project (in years)	Capital Recovery Factor
29	0.0736
30	0.0726
31	0.0718
32	0.0710
33	0.0703
34	0.0696
35	0.0690
36	0.0684
37	0.0679
38	0.0674
39	0.0669
40	0.0665
41	0.0661
42	0.0657

21	0.0850		43	0.0653
22	0.0830		44	0.0650
23	0.0813		45	0.0647
24	0.0797		46	0.0644
25	0.0782		47	0.0641
26	0.0769		48	0.0639
27	0.0757		49	0.0637
28	0.0746		50	0.0634

HUMAN RESOURCES/PUBLIC RELATIONS DIRECTOR
Amy Lyn De Zwart

Current Duties:

Has performed a wide variety of human resources and public relations functions in support of the District, Board of Directors, and General Manager; developed and implemented public relations campaigns and public and employee educational programs; generated materials, brochures, and other literature for public distribution; acted as District and board representative as assigned by the General Manager for committees, public events, ceremonies, conferences, service organizations, seminars, media, commissions, and task forces; and other related work as required.

Current Scope of Responsibilities:

- Participates with the General Manager, Treasurer, Operations Manager and District Supervisors to provide analysis and to establish goals and objectives for short-range and long-range planning.
- Conducts educational programs for schools and other community groups regarding ongoing water conservation awareness.
- Assists in the development of basic policies and procedures governing public relations and human resources.
- Works independently to manage, develop, and coordinate public relations, human resources, and public information programs.
- Monitors compliance with federal and state employment and labor relations practices.
- Prepares and maintains necessary records and reports.
- Develops and coordinates all special events, displays, informational materials, and brochures.
- Assists in the development and preparation of budget items related to Human Resources/Public Relations.
- Represents the District to outside organizations to include city, county, state, civic, and other related groups, as assigned.
- Acts as District spokesperson to the media and public.

- Prepares news items, newsletters, press releases, articles, and letters and responds to inquiries as directed.
- Gathers, disseminates, and maintains factual data, literature, reference materials, directories, and educational information from affiliated organizations and associations.
- Conducts polls and surveys as requested to determine public opinions on a variety of subjects.
- Recommends, organizes, and plans cultural, social, and recreational trips or activities for District employees.
- Acts as affirmative-action coordinator for the District.
- Adheres to District safety standards as described in the District *Safety Manual.*

Current Qualifications:

Knowledge of:

- State and Federal laws related to Human Resources/Public Relations duties.
- Practices and procedures of public relations, management, supervision, and human resources.
- Techniques, methods, and principles of disseminating accurate information to the public.
- Effective oral and written communication skills.
- Public oratory techniques and methods.
- District's mission, philosophy, and the public's expectations.
- Journalism practices, editing, prose, and research techniques.
- Personal computer word processing, desktop publishing, and current software programs.
- Operation of general office machines and equipment.
- Writes and prepares publications, reports, graphs, brochures and other materials.

Education and Experience:

- A four-year college degree with a major in American Studies from California State University, Long Beach.
- Seventeen years of progressively responsible administrative experience in a combination of public relations and human resources positions.

ASSOCIATE ENGINEER/GRANT WRITER
Richard Zack

Current Duties:

Under general direction of the District Engineer, assists with the District's engineering activities and services; identifies and investigates sources of grants and prepares grant proposals and applications; prepares studies and programs related to water facilities; prepares contract documents for water facilities to support water distribution activities; and provides support to the District Engineer. Performs other job-related duties as assigned.

Current Responsibilities:

- Inspects District projects
- Designs, manages, and oversees engineering services
- Prepares policies and procedures
- Prepares updated water model (H2O Net) of District's system
- Prepares District engineering standards and details
- Responds to inquiries on new developments; assists developers to understand District standards and policies and provides rapid turn around on development-related activities
- Assists with RFPs
- Monitors pending legislation relative to grants
- Identifies and investigates sources of grants for District projects
- Prepares grant proposals and applications
- Researches and prepares backup information and data required for grant submission
- Performs studies and prepares reports relative to various grant activities
- Monitors compliance of grants with District policies and rules, regulations, guidelines and policies of fundors
- Coordinates with consultants and reviews designs
- Conducts research and analyzes data; prepares reports and recommendations.
- Assists in the development of the engineering-services annual budget
- Enforces District policies and regulations; reviews written citations; reports at Board meetings as necessary
- Compiles and reviews engineering-related data; collaborates and confers with customers
- Designs facilities for water distribution; lays out and inspects construction activities; recommends modifications as appropriate
- Provides responsible staff assistance to the District Engineer
- Prepares staff reports and other necessary correspondence
- Responds to and resolves difficult and sensitive engineering-related citizen inquiries
- Adheres to District safety standards as prescribed in the District *Safety Manual*

QUALIFICATIONS

Knowledge of

- Principles and practices of engineering as they relate to water systems and water science engineering
- Public and private grant programs and procedures
- Current federal, state, and private grant requirements and reporting
- Basic methods of financial and statistical record keeping
- Principles of water systems management
- Bioengineering principles as they relate to water distribution operations
- Concrete design and construction planning methods and techniques
- Modern telemetry and SCADA systems
- Hydraulic network modeling
- Recent developments, current literature, and sources of information regarding water science engineering
- Principles and practices of project management
- Principles and practices of budget preparation and administration
- Pertinent federal, state, and local laws, codes, and regulations

Experience

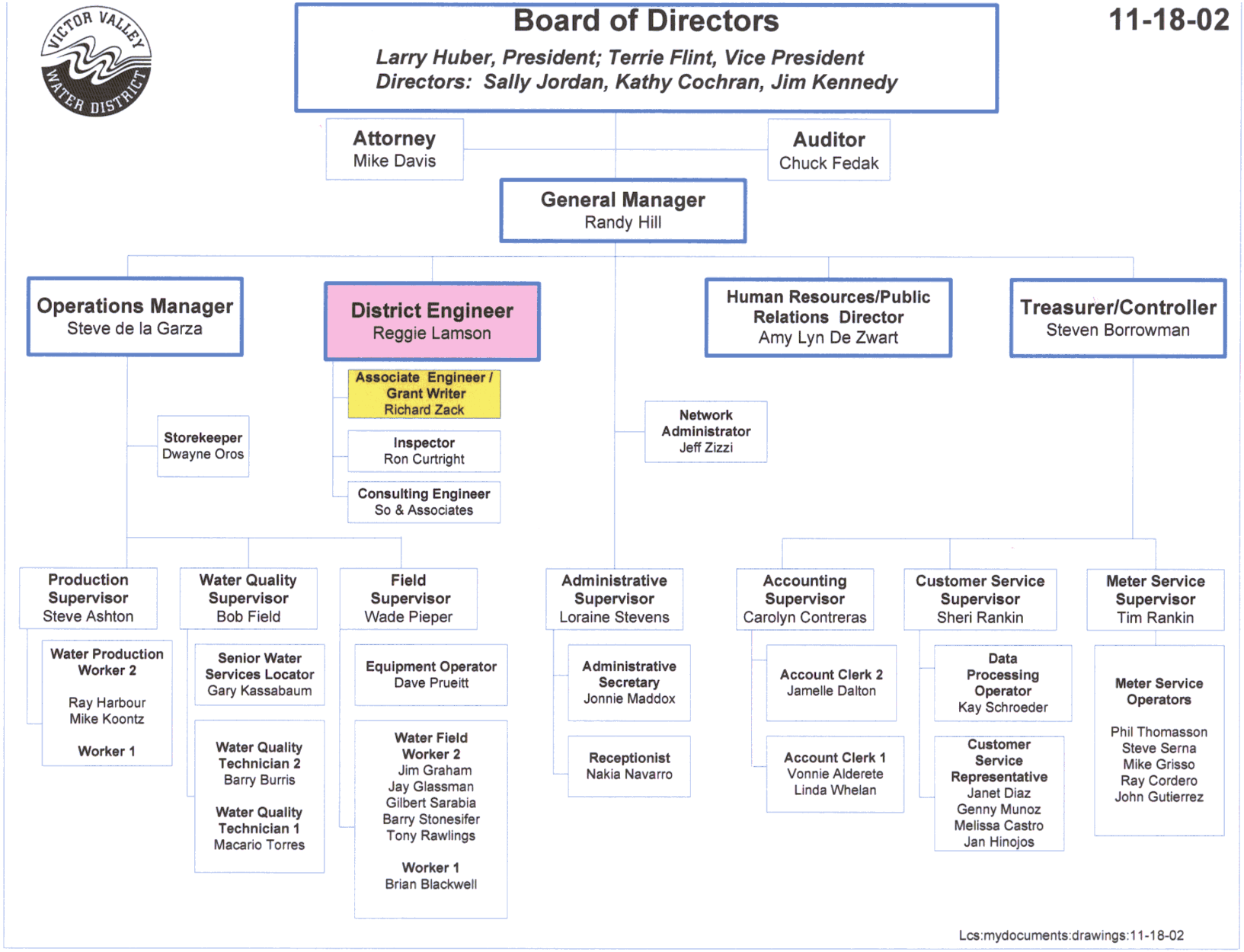
Fourteen years of increasingly responsible professional water science engineering experience and experience writing and administering grants.

Education

A four-year degree in Civil Engineering from California State University, Fresno.

Licenses

- California Registered Civil Engineer – 56310
- California Water Treatment Operator - 24216
- Mississippi Registered Civil Engineer – 13340
- State of California Water Treatment Operator I Certificate – 24216
- State of California Water Distribution Operator II Certificate - 16334


Board of Directors
Larry Huber, President; Terrie Flint, Vice President
Directors: Sally Jordan, Kathy Cochran, Jim Kennedy
11-18-02
Attorney
Mike Davis
Auditor
Chuck Fedak
General Manager
Randy Hill
Operations Manager
Steve de la Garza
District Engineer
Reggie Lamson
Human Resources/Public Relations Director
Amy Lyn De Zwart
Treasurer/Controller
Steven Borrowman
Storekeeper
Dwayne Oros
Associate Engineer / Grant Writer
Richard Zack
Inspector
Ron Curtright
Consulting Engineer
So & Associates
Network Administrator
Jeff Zizzi
Production Supervisor
Steve Ashton
Water Quality Supervisor
Bob Field
Field Supervisor
Wade Pieper
Administrative Supervisor
Loraine Stevens
Accounting Supervisor
Carolyn Contreras
Customer Service Supervisor
Sheri Rankin
Meter Service Supervisor
Tim Rankin
Water Production Worker 2
Ray Harbour
Mike Koontz
Worker 1
Senior Water Services Locator
Gary Kassabaum
Water Quality Technician 2
Barry Burris
Water Quality Technician 1
Macario Torres
Equipment Operator
Dave Prueitt
Water Field Worker 2
Jim Graham
Jay Glassman
Gilbert Sarabia
Barry Stonesifer
Tony Rawlings
Worker 1
Brian Blackwell
Administrative Secretary
Jonnie Maddox
Receptionist
Nakia Navarro
Account Clerk 2
Jamelle Dalton
Account Clerk 1
Vonnie Alderete
Linda Whelan
Data Processing Operator
Kay Schroeder
Customer Service Representative
Janet Diaz
Genny Munoz
Melissa Castro
Jan Hinojos
Meter Service Operators
Phil Thomasson
Steve Serna
Mike Grisso
Ray Cordero
John Gutierrez
Lcs:mydocuments:drawings:11-18-02

RULES AND REGULATIONS OF VICTORVILLE COUNTY WATER DISTRICT.

Article I - Organization.

Section 1. This organization is a County Water District, organized under and by virtue of the laws of the State of California, as provided in that certain statute entitled:

> "An act to provide for the incorporation and organization and management of county water districts, and to provide for the acquisition of water rights or construction thereby of waterworks and for the acquisition of all property necessary therefor, and also to provide for the distribution and sale of water by said districts." (Stats.1913,p 1049 as amended).

Article II - Name.

Section 1. The name of this organization is "Victorville County Water District."

Article III - Election of Directors.

Section 1. The directors of this organization shall be elected as provided by law.

Article IV - Powers of Board.

Section 1. The Board of Directors shall have such powers and shall perform such duties as are provided by law.

Section 2. In addition to the powers of the Board of Directors provided by law, said directors shall have the following powers:

(a) To appoint and remove at pleasure all agents and employees of the district and fix the compensation of any such agents or employess.

(b) To require of any officers, agents or employees a bond for the faithful performance of their duties.

(c) To conduct, manage and control all affairs and business of the district not inconsistent with law.

Section 3. In addition to the duties prescribed by law, said directors shall have the following duties:

(a) To cause to be kept a complete record of all meetings and proceedings of the Board of Directors.

(b) To cause to be kept a full and complete record of all finances of the District.

Article V - Officers.

Section 1. The officers of this District shall be a President, Vice-President and Secretary. The President and Vice-President shall be members of the Board of Directors. No member of the Board of Directors shall be eligible for the office of Secretary.

Article VI - Duties of Officers.

Section 1. It shall be the duty of the President:

(a) To perform all duties prescribed by law.

(b) To preside at all meetings of the Board of Directors and of the District.

(c) To sign as President all requisitions upon the County Treasurer and to sign all contracts and instruments in writing, which have first been approved by the Board of Directors.

(d To call a special meeting of the Board of Directors as provided in Article VII whenever he may deem it necessary or whenever it may be requested by three members.

(e) Subject to the Board of Directors, to have general supervision of the affairs of the District and to discharge such other duties for the benefit of the district as may be necessary as required.

Section 2. It shall be the duty of the Vice-President:

(a) To perform the duties of the President in his absence.

Section 3. It shall be the duty of the Secretary:

(a) To keep a record of all the proceedings of the Board of Directors.

(b) To keep a record of all finances of the district.

(c) To keep all records, books and documents of the district.

(d) With the approval of the Board of Directors, to attest and sign all requisitions and documents for and upon behalf of the District.

(e) To give all notices of meetings of the directors and all other notices as required by law and by the Rules and Regulations.

(f) To perform all such duties as are required by law.

Article VII - Meetings of Directors.

Section 1. The Board of Directors shall have and hold a regular meeting on the first Monday of each month at the hour of 7:30 o'clock P.M. at the offices of this district, or at such other place within the district as may be determined by the President and stated in the notice hereinafter mentioned.

Section 2. Special meetings of the Board of Directors may be called as hereinabove stated and shall be held at the offices of the District, or at such other place as may be determined by the President and stated in the notice hereinafter mentioned.

Section 3. Written notice of all meetings and of the place of holding the same shall be mailed to each director at his last known address, by the Secretary, at least three (3) days prior thereto; provided however, such notice may be waived by each and every director joining in a written waiver thereof, which shall be made a part of the minutes of such meeting.

Section 4. A majority of the directors shall constitute a quorum and a quorum of the directors shall be sufficient to transact business.

Article VIII -

Section 1. The Board of Directors shall act only by ordinance or resolution. The ayes and noes shall be taken upon the passage of all ordinances or resolutions and entered upon the journal of the proceedings of the Board of Directors.

Article IX.

Section 1. The Board of Directors shall fix all water rates, and shall do all things necessary in the supplying of the inhabitants of the District with water.

Article X.

Section 1. These rules and regulations may be amended at any regular meeting of the Board of Directors or at any special meeting called for the purpose and so stated in the notice calling such special meeting, by a majority vote of the Board of Directors or of those present at any such meeting duly and regularly called.

The hereinabove rules and regulations are hereby adopted as the Rules and Regulations of the Victorville County Water District this 9th day of January, 1932.

Walter S Colvert

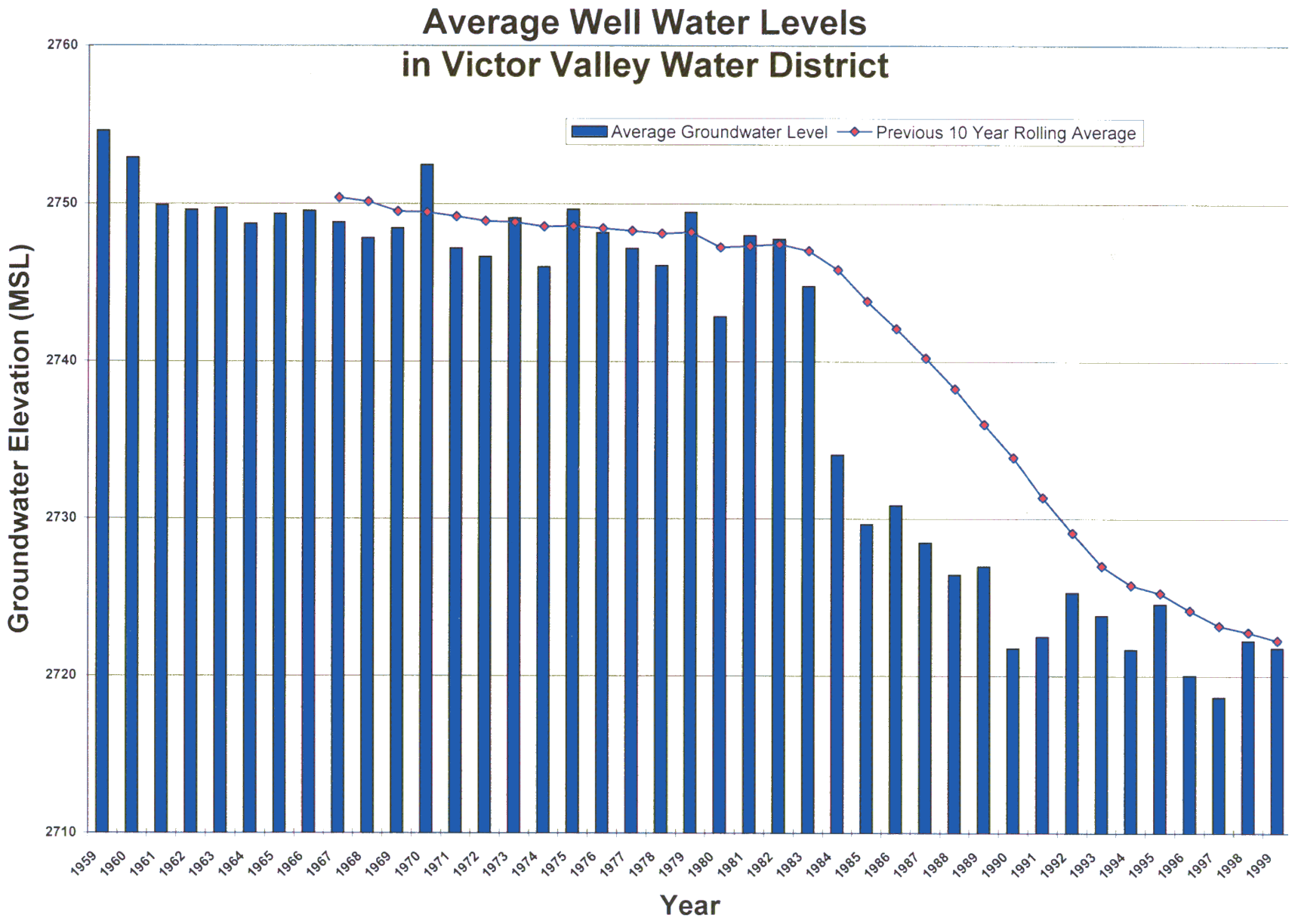
J. A. Farrington

[illegible]

F. L. Arnold

E. G. Button

Board of Directors.



Randy Hill 11/26/2002 Water Levels in Wells total average Composite Water Level

Application of Tracers in Arid Zone Hydrology (Proceedings of the Vienna Symposium, August 1994). IAHS Publ. no. 232, 1995.

Source, movement and age of groundwater in the upper part of the Mojave River basin, California, USA

JOHN A. IZBICKI & PETER MARTIN
US Geological Survey, WRD, 5735 Kearny Villa Road, Suite O, San Diego, California 92123, USA

ROBERT L. MICHEL
US Geological Survey, WRD, 345 Middlefield Road, Menlo Park, California 94025, USA

where the river has not flowed for several years.

The alluvial aquifer is surrounded and underlain by older alluvium and fan deposits that compose the regional aquifer, which is more than 300 m thick and contains most of the groundwater in storage (California Department of Water Resources, 1967). Groundwater pumpage from the regional aquifer has increased in recent years and water levels in some areas are declining as much as 1.5 m per year. The older alluvium and fan deposits are partly cemented and are finer grained and less permeable than the deposits that compose the alluvial aquifer; however, the older alluvium is less consolidated and more permeable than the fan deposits. In previous studies most of the recharge to the regional aquifer was believed to occur near the San Bernardino and San Gabriel Mountains and groundwater was assumed to flow toward the Mojave River (Hardt, 1971). Little areal recharge was believed to occur through the thick unsaturated zone (more than 300 m in some places) because of the small amount of precipitation and the cemented nature of the deposits.

The above excerpt is from a larger report, written by the U.S. Geological Survey, on the age of the water and the lack of deep recharge of the groundwater within the Mojave Basin. Even though the report is not specifically related to the over-draft problems of Victor Valley Water District, it does confirm that groundwater over-draft is a common problem with the High Desert of California.

Victor Valley Water District is technically ready for weather satellite-activated evapo-transpiration irrigation controllers. The local College offers classes that will enhance the training of District staff.

Victor Valley COMMUNITY COLLEGE

Student Services | Class Schedule | Admissions | Campus Life | Departments & Offices | Staff Directory

CLASS SCHEDULE
SPRING 2003

ELCT 54
ELCT 66
ELCT 65
ELCT 67
ELCT 69
ELCT 73
ELCT 80
ELCT 81
ELCT 84
ELCT 85
ELCT 86
ELCT 87
ELCT 88
ELCT 91
ELCT 92
ELCT 95
ELCT 96
ELCT 97
ELCT 107

Class Schedule
VVCC HomePage

search

ELECTRONICS & COMPUTER TECHNOLOGY/INDIVIDUALIZED INSTRUCTION CLASSES

MANDATORY ORIENTATION

Students registered for a 18 week or first 9-week individualized instruction class must attend one of the following four orientation meetings:

Monday, January 13, 10:00am-11:00am or 5:30pm – 6:30pm.
Tuesday, January 14, 10:00am-11:00am or 5:30pm-6:30pm

Students registered for a second 9-week individualized instruction class must attend one of the following two orientation meetings:

Monday, March 17, 10:00am-11:00am or 5:30pm-6:30pm.

ELCT 54 ELECTRONIC COMMUNICATION SYSTEMS (4.0 Units)-
A study of modern communication systems. Topics include: digital and data communications, transmission lines, wave propagation, antennas, wave guides and radar, microwave and lasers, and fiber optics.

		Room	
4572	8.0 Wkly hrs by arr	EL3	FARO T

SEE MANDATAORY ORIENTATION DATES

ELCT 60 TECHNICAL CALCULUS FOR ELECTRONICS II (3.0 Units)-
This course in technical calculus for electronics continues the study of functions and further operations. Topics include: Trig functions, logarithmic and exponential functions, hyperbolic functions, partial derivatives, integration techniques, double integrals, infinite series, MacLaurin series, Taylor series, Fourier series, and introduction to differential equations.

		Room	
4573	6.0 Wkly hrs by arr	EL4	FARO T

SEE MANDATAORY ORIENTATION DATES

ELCT 65 PC MONITORS (3.0 Units)-
The student will learn how to identify, classify, and isolate various monitor faults, and how to troubleshoot the monitor system utilizing standard laboratory equipment such as multimeters, signal generators, and oscilloscopes. This course meets the objectives of the PC monitor section of the A+ certification examination.

		Room	
4574	6.0 Wkly hrs by arr	EL3	FARO T

SEE MANDATAORY ORIENTATION DATES

ELCT 67 PC LASER PRINTERS (2.0 Units)-
This course covers the fundamentals of maintaining and repairing laser printers. Particular emphasis is placed on formulating accurate troubleshooting procedures and techniques. The course covers the objectives of the laser printer section of the A+ certification examination.

		Room	
4575	8.0 Wkly hrs by arr (1/13- 3/14)	EL2	FARO T

SEE MANDATORY ORIENTATION DATES

4576	8.0 Wkly hrs by arr (3/17- 5/22)	EL2	FARO T

SEE MANDATORY ORIENTATION DATES

ELCT 69 NETWORK TOPOLOGIES AND CABLING (2.0 Units)-
This course provides the technical instruction and practical hands on skills to configure standard computer networks, construct the appropriate cables, install the proper connectors, and test the completed system with standard industrial test equipment.

		Room	
4577	8.0 Wkly hrs by arr (1/13- 3/14)	EL3	FARO T
SEE MANDATORY ORIENTATION DATES			
4578	8.0 Wkly hrs by arr (3/17- 5/22)	EL3	FARO T
SEE MANDATORY ORIENTATION DATES			

ELCT 73 MICROPROCESSOR PRINCIPLES (4.0 Units)-
This course covers computer number systems and codes, computer arithmetic, programming the internal register, structure of the 6800 and 6808 microprocessors, microprocessors interfacing to RAM, ROM, and various input/output devices, input and output data operations through a peripheral interface adapter, and applications of the PIA.

		Room	
4579	8.0 Wkly hrs by arr	EL3	HARRIMAN D
SEE MANDATORY ORIENTATION DATES			

ELCT 80 FIBER OPTICS CABLING (3.0 Units)-
Prerequisite: ELCT 69. This course is designed to introduce students to fiber optic communications, transfer equipment and cabling. Students will explore fiber optics theory, operation of transfer equipment, assembly and repair of fiber optic cabling.

		Room	
4584	12.0 Wkly hrs by arr (1/13- 3/14)	EL3	FARO T
SEE MANDATAORY ORIENTATION DATES			
4585	12.0 Wkly hrs by arr (3/17- 5/22)	EL3	FARO T
SEE MANDATAORY ORIENTATION DATES			

ELCT 81 SOLDERING THEORY AND TECHNIQUES (1.0 Unit)-
This practical course provides the student with hands-on experience covering soldering theory and techniques. Topics include: soldering theory, types of soldering irons, soldering iron tips, soldering guns, solder connections, and unsoldering techniques.

		Room	
4586	2.0 Wkly hrs by arr	EL3	FARO T
SEE MANDATORY ORIENTATION DATES			

ELCT 84 COMPUTER NETWORKING (3.0 Units)-
This course is intended for students, office personnel working in a computer network environment, and others within the community who desire to gain hands-on experience in installing, servicing, and upgrading personal computer networks. Satisfies computer industries' A+ certification requirements.

		Room	
4587	6.0 Wkly hrs by arr	EL2	FARO T
SEE MANDATORY ORIENTATION DATES			

ELCT 85 OPTOELECTRONICS: FIBER OPTICS (3.0 Units)-
This course is intended for advanced students, technicians in industry needing formal course work to upgrade skills, and technicians in industry-sponsored apprenticeship programs interested in fiber optics.

		Room	
4588	6.0 Wkly hrs by arr	EL3	FARO T
SEE MANDATORY ORIENTATION DATES			

ELCT 86 OPTOELECTRONICS: LASERS (3.0 Units)-
This course is intended for advanced students, technicians in industry needing formal course work to upgrade skills, and technicians in industry-sponsored apprenticeship programs interested in lasers.

		Room	
4589	6.0 Wkly hrs by arr	EL3	FARO T

ELCT 87 INDUSTRIAL ELECTRONICS: INDUSTRIAL CONTROL SYSTEMS, DEVICES, & CIRCUITS (3.0 Units)-
This course is intended for advanced students, technicians in industry needing formal course work to upgrade skills, and technicians in industry-sponsored apprenticeship programs interested in industrial control systems, devices, and circuits.

Room
4590 6.0 Wkly hrs by arr EL3 FARO T
SEE MANDATAORY ORIENTATION DATES

ELCT 88 INDUSTRIAL ELECTRONICS: INDUSTRIAL PROCESS CONTROL APPLICATIONS (3.0 Units)
This course is intended for advanced students, technicians in industry needing formal course work to upgrade skills, and technicians in industry-sponsored apprenticeship programs interested in industrial process control applications.

Room
4591 6.0 Wkly hrs by arr EL3 FARO T
SEE MANDATAORY ORIENTATION DATES

ELCT 91 MICROPROCESSOR INTERFACING (3.0 Units)-

This course is intended for advanced students, technicians in industry needing formal course work to upgrade skills, and technicians in industry-sponsored apprenticeship programs interested in microprocessor interfacing.

Room

6.0 Wkly hrs by arr EL3 FARO T

SEE MANDATAORY ORIENTATION DATES

ELCT 92 MICROPROCESSOR APPLICATIONS (3.0 Units)-

This course is intended for advanced students, technicians in industry needing formal course work to upgrade skills, and technicians in industry-sponsored apprenticeship programs interested in microprocessor applications.

Room

6.0 Wkly hrs by arr EL3 FARO T

SEE MANDATAORY ORIENTATION DATES

ELCT 95 PERSONAL COMPUTER SERVICING (3.0 Units)-
This course is intended for advanced students, technicians in industry needing formal course work to upgrade skills, students in tech-prep and school-to-work programs, and technicians in industry-sponsored apprenticeship programs interested in PC servicing. Satisfies computer industries' A+ certification requirements.

Room

6.0 Wkly hrs by arr EL2 FARO T

SEE MANDATAORY ORIENTATION DATES

ELCT 96 PERSONAL COMPUTER TROUBLESHOOTING (3.0 Units)-

This course is intended for advanced students, technicians industry needing formal course work to upgrade skills, and technicians in industry-sponsored apprenticeship programs interested in PC troubleshooting. Satisfies computer industries' A+ certification requirements.

Room

6.0 Wkly hrs by arr EL2 FARO T

SEE MANDATAORY ORIENTATION DATES

ELCT 97 TELECOMMUNICATIONS: DIGITAL COMMUNICATIONS (3.0 Units)-

This course is intended for advanced students, technicians in industry needing formal course work to upgrade skills, and technicians in industry-sponsored apprenticeship programs interested in digital communications.

Room

4596 6.0 Wkly hrs by arr EL3 FARO T

SEE MANDATAORY ORIENTATION DATES

ELCT 99 TELECOMMUNICATIONS: MICROWAVE COMMUNICATIONS (3.0 Units)-

This course is intended for advanced students, technicians in industry needing formal course work to upgrade skills, and technicians in industry-sponsored apprenticeship programs interested in microwave communications.

Room

6.0 Wkly hrs by arr EL3 FARO T

SEE MANDATAORY ORIENTATION DATES

ELCT 107 A+ CERTIFICATION EXAMINATION PREPARATION (2.0 Units)-
This course is designed to prepare the student to pass the Computing Technology Industry Association (CompTIA) A+ Certification Test as quickly and easily as possible. The course consists of a test-simulation-and- review software program that provides practice tests with realistic questions, a study guide, and reference materials.

Room

8.0 Wkly hrs by arr EL1 FARO T

(1/13- 3/14)

SEE MANDATAORY ORIENTATION DATES

8.0 Wkly hrs by arr EL1 FARO T

(3/17- 5/22)

SEE MANDATAORY ORIENTATION DATES

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City of Fremont's Formula for Reducing Irrigation Water Consumption

The City of Fremont is the largest single water user in the Alameda County Water District, irrigating over 200 acres of turf, shrubs, and ground cover in 40 parks. ACWD makes CIMIS data accessible by telephone, local newspapers, and other public outlets. In 1992, the City of Fremont developed a water conservation plan using available CIMIS data, in conjunction with a new sprinkler control system. In order to be effective, this system would need:

a method of quickly, simply, and accurately resetting controller irrigation times to deliver precisely the amount of water dictated by current weather conditions. If the process isn't easy, it won't get done;

the ability to stop or prevent watering when rain is expected or when it is actually raining; and

the ability to instantly turn off controllers that are watering.

In fall 1992, the city installed 58 percentage control adaptors in 33 of its parks and 22 units on medians. Percentage control was implemented in 1993. Irrigation water consumption in 1993 was 59 percent of 1990 consumption, a reduction of 41 percent. In 1994, the city won first place in the statewide Water Awareness Campaign, sponsored by several government entities and four major water districts.

In 1995, 10 Fremont parks were studied to compare 1994 weekly consumption with that of 1990. The total irrigated area of the 10 parks is 35 acres, 80 percent in turf and 20 percent in shrubs and groundcover. Total consumption for the 10 parks in 1990 was 54,372 HCF. In 1994, the consumption from water meter records was 34,401 HCPs, a reduction of 19,971 HCF, or 37 percent less than 1990 consumption.

For the 10 parks, the annual net savings after the required communication fee was $14,000; the installed cost of the 12 percentage control adaptors was $20,600, a 68 percent rate of return on investment.

For further information, contact Eric Cartwright, Alameda County Water District, 43885 South Grimmer Boulevard, Fremont, California 94538; (510) 659-1970.

SOLANO COUNTY WATER AGENCY
Public Hearing Notice

Notice of Public Meeting for Acceptance of Water Conservation Grant by the Solano County Water Agency

Date: Thursday, October 10, 2002

Location: Solano Irrigation District Board Room
508 Elmira Road
Vacaville, CA 95687

Time: 7:00pm (included in the monthly SCWA Board of Directors meeting)

Subject: Solano Large Landscape Evapotranspiration Controller System Project

This project is the installation of computerized irrigation controllers at large public landscapes that control the amount of water applied based upon weather conditions and plant needs. Installation of these facilities will result in a more efficient irrigation of city parks and school landscapes saving water and money. Studies have shown that more efficient irrigation of large landscapes is one of the most cost effective methods of reducing significant amounts of water use in urban areas. The total project cost is estimated to be $229,412. The State grant will provide $195,000 with local costs of $34,412. The local funding will come from in-kind services from the public agencies sponsoring the projects and possible matching funds provided by the same agencies. Up to six large landscape sites will be equipped with the controllers. The sites will be located within the cities of Benicia, Fairfield, Vacaville and Vallejo.

The purpose of the meeting is to inform the public of the proposed project, to provide a forum for public comment on the method of financing the project, and to demonstrate public support for the project.

The Solano County Water Agency is the recipient of the grant and will be providing interim funding for the installation and will be receiving reimbursement from the State. The project is expected to be completed in the spring of 2003. There is no direct cost associated to the Solano County Water Agency for this project. Costs for participating cities and school districts will mostly be through in-kind services and is not estimated to have a measurable impact on customer water service charges.

The Water Agency invites public attendance and participation at the meeting. The public meeting will be held as part of the monthly Solano County Water Agency Board of Directors meeting. The Agency will also accept written comments preferably in advance of the public meeting. Written comments will be accepted through October 18, 2002.

Additional information on the grant and the projects are available from the Solano County Water Agency. Contact us at (707) 451-2852 for additional information.

(Copied from website: www.scwa2.com/A73.WaterConsGrantInfo.htm)

The significance of this public hearing notice is that the project is very similar to that of the Victor Valley Water District. The major difference between the two projects is the climate. Solano County Water Agency is on the fringe of the milder Bay-Delta and the Central Valley climates whereas Victor Valley Water District is in the harsher High Desert climate. This climate difference could make a difference in the type or brand of ET Controller chosen by each water agency.

group the least. Although both the controller retrofits and postcard reminders generated statistically significant savings, the ET controllers were able to convert roughly 85% of the pre-retrofit conservation potential into achieved savings, while postcard reminders were able to convert only about 30%. Nonetheless, it is worth noting that given the proper circumstances, such as an aggressive tiered rate structure and an effective customer outreach program, simple postcard reminders can produce meaningful reductions in water use. No statistically significant change was observed in the reference group.

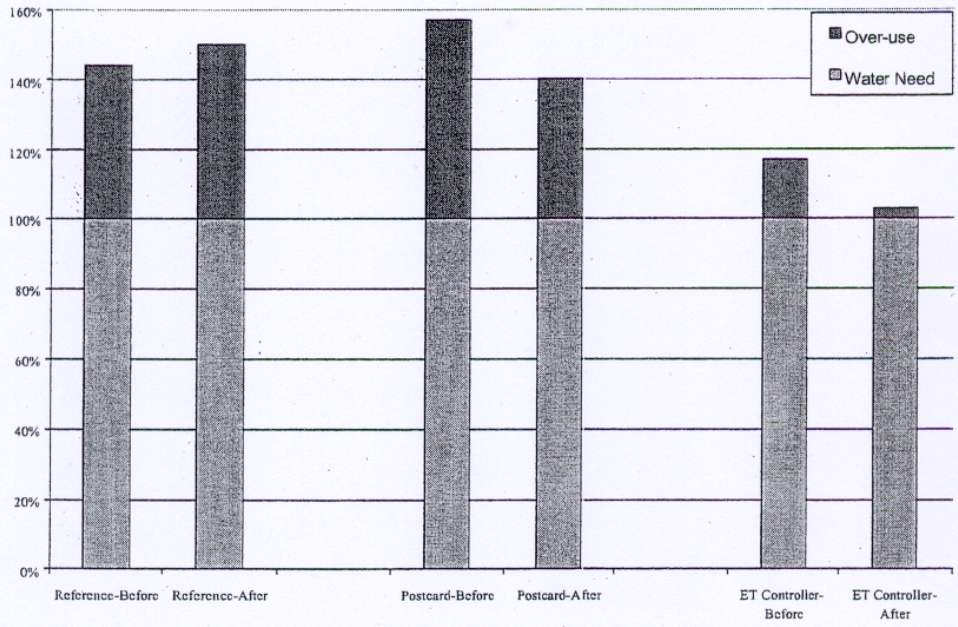


Figure 1 Estimated Outdoor Usage Relative to ETo-Based Water Budget

Extending the analysis to IRWD's service area

An additional analysis was undertaken to estimate the possible level of savings from a larger and more representative sample of high water-using single-family homes within IRWD. This analysis suggests that by targeting roughly the top third of homes in terms of water use (approximately 10,000 homes) ET controllers might be expected to save roughly 57 gallons per household per day, a reduction of 10% in total water use, or 24% in outdoor use. Combined, these 10,000 single-family homes would be projected to save over 200,000,000 gallons (614 acre feet) per year.

Study results were extrapolated to a larger set of single-family households for illustration purposes only. Without further study of water savings in different communities with different rate structures, different levels of customer education, and different ET requirements, it would be inappropriate to consider 57 gallons per day as a regional savings value.

WeatherTRAK® Irrigation Controller

WeatherTRAK is a revolutionary new kind of irrigation controller that ***directly replaces*** any type of sprinkler timer presently installed in your home. No additional wiring is needed. *WeatherTRAK* has a built-in radio receiver tuned to our National Weather Broadcasting Service. Every day, the controller receives a new ***real time*** wireless weather update from our service and adjusts itself automatically. A new schedule is created, tailored to your landscape. It then runs the schedule without further adjustments by the user.

Features:

- Uses ***real time*** weather data, not historical "averages"
- Automatically calculates correct irrigation schedules
- Updates the schedule daily
- Eliminates repetitive programming of the controller
- Improves plant health (no over-watering)
- Minimizes runoff
- Can save enough water to pay for itself and the service
- Doesn't water in rainy periods
- Exactly tracks ***local*** weather
- Easy to use three knob interface makes setup painless

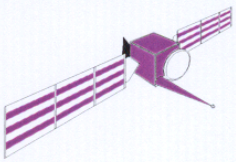
The Weather Broadcasting Service costs about 16¢ per day. Even small to moderate sized landscapes can recover this cost on water savings alone without considering the value of healthier landscapes, less runoff and erosion as well as much greater convenience of use. Some current users of this technology haven't adjusted their controllers for years! The controller will not water during major rainfall activity. To avoid watering even in minor rain conditions, an optional low-cost rain sensor can be installed.

Specifications:

8 or 12 Station Units Available
Industry Standard Hook-up (replaces any controller)
Optional Low Cost Rain Sensor
Indoor Installation -- Outdoor Boxes Available
Includes Wall Transformer

Pricing:

Call Factory for Pricing and Availability in Your Area



Network Services Corporation
561 Sky Ranch Drive
Petaluma, California 94954
(800) 362-8774 • Fax (707) 769-9695

Frequently Answered Questions (FAQs)

What is ET?

ET (EvapoTranspiration) is defined as the amount of water used by a particular plant species (by transpiration) plus the amount of water evaporated from the surface of the soil under measured weather conditions. Usually these amounts are accumulated for short periods of time such as a day or a week and then expressed as an amount of rainfall that would be needed to just exactly replace the amount used. In the United States we use inches of precipitation (rainfall) to express this. If it doesn't rain enough, then irrigation will be needed.

The WeatherTRAK irrigation controller uses this real-time ET data to internally design optimized irrigation schedules. The user does not have to bother with creating schedules and typing them into the controller.

How is ET measured?

ET information can only be obtained from specialized weather stations, which have **at least four** calibrated sensors. As a minimum, the stations measure Temperature, Relative Humidity, Wind Speed and Solar Radiation throughout the day and night. The readings are transmitted daily to central computer facilities which calculate the ET according to a standardized equation. Here is the equation:

$$ET_o = \frac{0.408\Delta(R_n - G) + \gamma \frac{900}{T+273} u_2 (e_s - e_a)}{\Delta + \gamma(1 + 0.34u_2)}$$

This is the Penman-Monteith equation *(there won't be a test on this!)* It has been adopted as **the** worldwide standard for estimating plant water use by the Food and Agriculture Organization (FAO) of the United Nations.[1] To quote from this Standards Document:

"The FAO Penman-Monteith method is recommended as the sole method of determining ET."

Using ET to optimize irrigation of crops has been the subject of research by many scientists both here and abroad for over 50 years.

[1] See "Crop Evapotranspiration Guidelines for Computing Crop Water Requirements – FAO Irrigation and Drainage Paper 56" by Richard G. Allen, et. al. (FAO 1998) http://www.fao.org/docrep/X0490E/X0490E00.htm

How often does the WeatherTRAK® unit get new ET readings?

The WeatherTRAK controller is updated daily. If the ET is substantially the same as the previous day it is told to continue using the previously transmitted number. If a significant change has occurred then a new ET value is transmitted. Generally about 100 to 150 new values need to be transmitted per year depending on the local weather conditions.

Why not just use some historical average ET and avoid the complexity and cost of transmitting real-time data?

The weather is far too variable from one year to another to be able to use a historical "average" number to estimate the water requirement for any particular day. Average historical weather data is useful in estimating the *annual* water requirements of some proposed crop.

Can't you just install a sensor and figure out the ET at the site where the sprinkler timer is located?

Determining the ET requires **four** sensors that are properly calibrated. No particular sensor dominates the equation so one cannot rely on one or two sensors for any length of time without the risk of very large errors occurring. These potential errors can only be counteracted by over-watering all the time or constantly fiddling with the controller. Quoting again from FAO-56:

"The use of an alternative ET_o calculation procedure, requiring only limited meteorological parameters, should generally be avoided."

How do I hook up the WeatherTRAK to my existing sprinkler timer?

You don't. The WeatherTRAK **totally replaces** your existing equipment. It is a sophisticated irrigation controller combined with a sensitive radio data receiver in a single box. Wiring is exactly the same as a regular timer and you will not need any new wires.

What if, after using the WeatherTRAK system for some time, I decide it's not worth the small monthly subscription cost?

Just cancel your subscription. The controller will operate as a regular sprinkler timer just as well or better than any other unit on the market.

NETWORK SERVICES CORPORATION

CURRENT STATUS OF IRRIGATION CONTROLLER TECHNOLOGY

May 4, 2002

by Michael Antares, Principal Scientist

BACKGROUND

In order to fully appreciate the issues involved with the proper scheduling of landscape irrigation controllers it is important to understand the interaction between a plant, its surrounding soil and water contained in the soil.

A plant extracts water from the soil through its roots. The upper two-thirds of the root system takes up most of the water and this is identified as the effective root zone. Water below this depth is essentially lost to the plant. It is generally considered ideal if the amount of water available to the plant varies between saturated soil and soil that is depleted to 50% of the water ultimately available to the plant. If all of the available water is taken up by the plant, the plant will wither and die. So, ideally, the irrigation system will apply sufficient water to just saturate the soil at the time when the depletion level has reached 50%. Plants can also die if subjected to continuously saturated soil.

The amount of time it takes the soil to go between saturation and 50% depletion depends on several variables. The type of soil and the plant root depth will determine how much water is available to the plant when the soil is saturated. Water is then lost through evaporation and transpiration. The rate of loss is dependent on several weather parameters as well as the type of plant. Typically the loss is expressed as an ET or Evapotranspiration value, and is measured in inches or millimeters of water. The daily ET value varies greatly throughout the year and roughly follows the sun angle for the site latitude and time of year; that is, it is higher in the summer and lower in the winter in the northern hemisphere. However, short term variations in ET on a daily or weekly basis, can vary significantly from either the sun angle prediction of ET or a long-term average of ET for any particular location. This is in line with the normal variations in weather that make accurate weather prediction essentially impossible when the prediction is based on historical averages. In addition, longer-term variations caused by the El Niño or La Niña phenomena, can cause the ET to vary greatly from an historical average for a period of several months.

SPRINKLER TIMERS

The simplest sprinkler timer is a time-clock device. It turns on for a preset amount of time for a preset number of days each week and follows this schedule without alteration unless changed by the user. It has two major deficiencies. It is obvious that if it is set once for the correct amount of water to be applied in the summer, it will grossly over-water in the cooler months. Secondly, it has no ability to track sudden changes in the weather. This will inevitably result in over or under watering even during the times when it supposedly has been set correctly unless the user is willing to alter the settings on almost a daily basis.

CONTROLLERS WITH STORED HISTORICAL WEATHER DATA

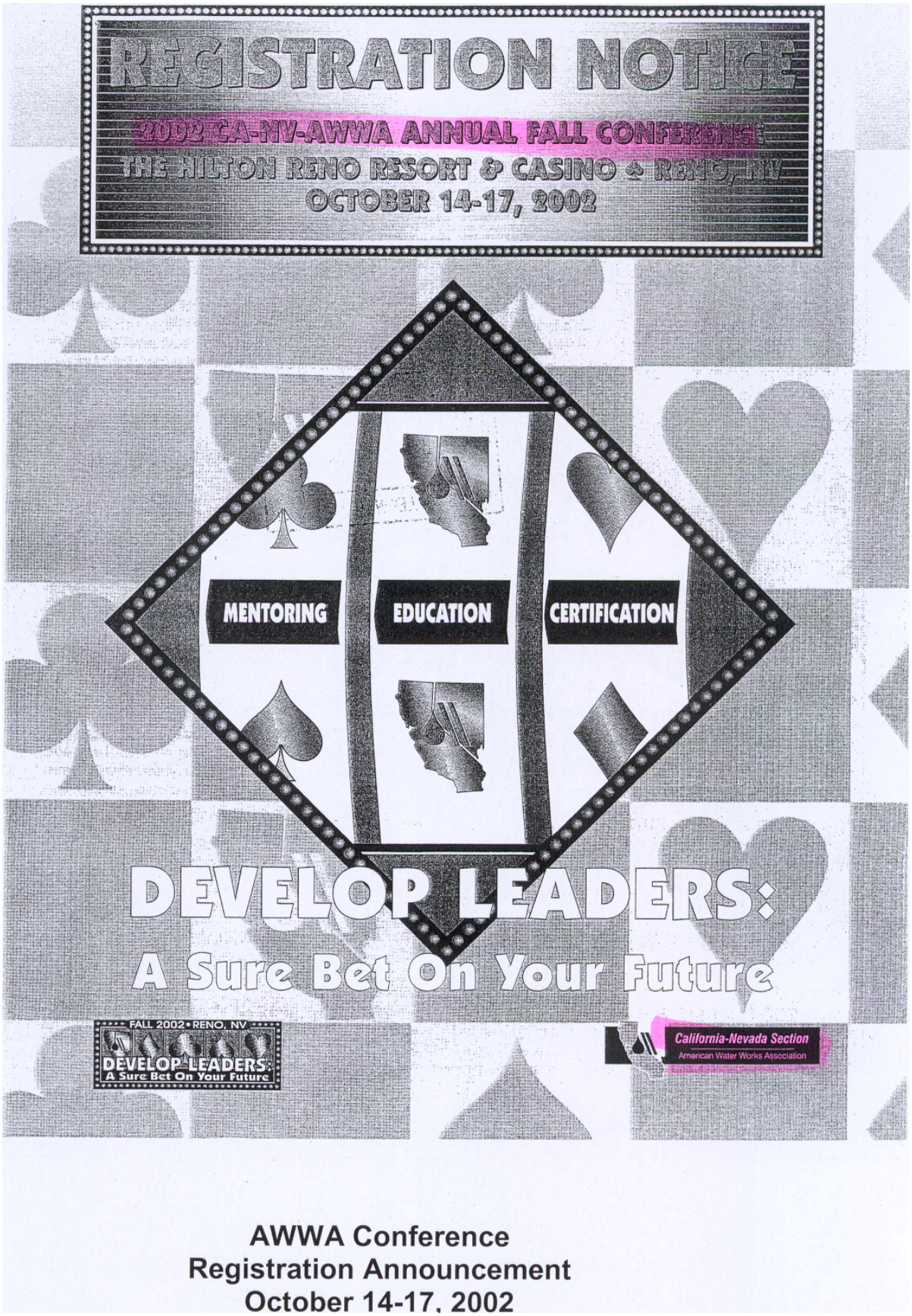
The next level of sophistication is a controller that has a stored ET curve for the anticipated site location. In some instances it will also have an auxiliary sensor to modify the stored data. This type of controller has several inherent limitations.

a) Real weather varies greatly from any average value. On a day- to-day basis it is not possible to accurately predict the weather from historical data alone (see above). This is so obvious that it should not need stating.
b) Although it might seem that this controller is a significant improvement over the time-clock version it has the serious fault of implying an ability to adequately track the weather that it in fact does not have.
c) Day-to-day variations in the weather can easily cause the controller to over or under water. If a user adjusts it so that it seldom or never under-waters, it will over-water almost all the time.
d) Attempting to modify the stored data with an external sensor (temperature or solar radiation) will create another level of implied ability that is not present. No single sensor or sensor pair can predict the ET value reliably. ET is a function of temperature, wind speed, solar radiation and relative humidity. Each of these parameters has the power to significantly modify the ET value. For example, variations in temperature will affect the ET value very differently in a no-wind situation than when the wind is blowing. Obviously, if this were not the case, the equation for determining ET would not have to have all four terms.

CONTROLLERS WITH REAL-TIME WEATHER DATA

The highest level of sophistication is a controller that is continuously updated with the current ET. The only controller with this capability currently available is the Network Services Corporation WeatherTRAK controller. This controller overcomes all of the disadvantages of the other controller types.

a) Because it continuously receives the current ET value, it can compute depletion on a real-time basis. It can automatically create a schedule that waters several times each day or a schedule that waters once in several weeks and will re-calculate the schedule whenever there is a change in the ET. It never irrigates an arbitrary amount of time and thus does not over or under-water no matter how much the weather fluctuates from some norm or historical value. Note that most controllers are limited to a weekly schedule. However, the optimum schedule for a deep-rooted plant (a tree, for example) can require irrigation intervals of several weeks. The WeatherTRAK controller can establish irrigation intervals of up to 8 weeks.
b) Although other controller types permit multiple start times to be entered and thus can create a pseudo soak period to avoid runoff, the WeatherTRAK controller actively calculates cycle length, number of cycles, soak time and number of start times so that the irrigation is optimized for the type of soil, the plant type and root depth, the soil slope, and the microclimate as well as considering the current weather. These calculations are continuously adjusted to match the current weather.
c) WeatherTRAK is the only controller that irrigates using a depletion model algorithm. It continuously calculates how much water is remaining in the soil and will irrigate as closely as possible to the time when the 50% depletion level is reached (because the start time is fixed by the user, there will generally be a small error in the actual depletion level at the time of irrigation). This assures a landscape that will remain healthy regardless of changes in the weather.



AWWA Conference
Registration Announcement
October 14-17, 2002

presentation: That attendees understand water issues in Southern Nevada and the SNWA's response to these issues, and are able to utilize this understanding to better solve water resource problems in their own communities.

4:00 pm Against Industry Odds - Public Acquisition of Private Water Co. - Lori Williams, Truckee Meadows Water Authority. Desired outcome of presentation: To present some ideas and solutions that may be applicable for others and not contemplated through public/private partnerships. It will talk about some interesting political and water issues for the region.

4:30 pm Dealing With Drought in the Desert - Randy Hill, Victor Valley Water District. Desired outcome of presentation: To provide knowledge of the programs utilized by VVWD, and provide insight into how VVWD's experiences can be useful to the attendees in their own work.

5:00 pm ADJOURN

THURSDAY, OCTOBER 17, 2002

SESSION 12 - OPERATIONS AND MAINTENANCE DIVISION

Bill Watson, Chair, Metropolitan Water District
Chet Malewski, Vice Chair, Truckee Meadows Water Authority

SECURITY AND EMERGENCY PLANNING
Steve Dennis, Chair, Alameda County WD

8:15 am Critical Infrastructure Protection - Small/Medium Systems Approach - Marvin Young, EPA Region 9 & Bruce Macler, EPA Region 9. Desired outcome of presentation: To help broaden the attendee's subject understanding of system security and introduce new perspectives to questions typically asked during a security assessment.

9:15 am Water System Security - It's Not Just A Problem For Big Utilities. The City of Beverly Hills - A Case Study - Part 1 - Brian Jordan, Black & Veatch. Desired outcome of presentation: To provide small and medium sized utilities a better understanding of the factors that should be considered when evaluating whether to conduct a security vulnerability assessment and the level of effort that should go into that assessment.

10:15 am Water System Security - It's Not Just A Problem For Big Utilities. The City of Beverly Hills - A Case Study - Part 2 - Robert Beste, City of Beverly Hills.

10:45 am Security Vulnerability Assessments in the Water Industry - A Progress Report. An informative panel discussion on vulnerability assessment strategies, emergency response plan updates, and water utility approaches to physical protection improvements. - Five Representatives from Water Industry Utilities.

11:45 am ADJOURN

SESSION 13 - WATER DISTRIBUTION DIVISION

John Corella, Chair, Coachella Valley WD
Maris Janson, Vice Chair, Boyle Engineering Corp.

MATERIALS PERFORMANCE COMMITTEE
Don Ellison, Chair, Helix WD

8:15 am Grooved Piping Systems for the New Millennium - Matt Minamyer, Star Pipe Products. Desired outcome of presentation: A discussion on the engineering, applications, and field installations of grooved piping systems and appurtenances.

8:45 am Gate Valves- From Scrap to Your Warehouse - Randy Looney, American AVK Co. Desired outcome of presentation: Educate participants on what it takes to construct these valves, discuss costs and what capabilities the valve has.

9:15 am An Exploration into the World of Underground Bolt/Nut Coating Systems - John Corella, Coachella Valley WD. Desired outcome of presentation: Provide attendees a broader look at the available options and results by using different coating systems.

9:45 am BREAK

CORROSION CONTROL COMMITTEE
John Barnes, Chair, RBF Consulting

10:15 am Repair of Reinforced Concrete at the Molecular Level. The Emerging Use Of Chemically Reactive Penetrates - Matthew Hunter Kramer, Suretreat West Desired outcome of presentation: Lecture will give an overview of the complex chemical reactions that both build, and destroy concrete.

10:45 am ADJOURN

SESSION 14 - WATER QUALITY DIVISION

Jamal Awad, Chair, CH2M Hill
Bruce Macler, Vice Chair, US EPA

WATER TREATMENT COMMITTEE
Rick Mann, Chair, Metropolitan Water District

8:15 am The Impact of the Draft UV Disinfection Requirements on UV Facility Design and Operation - Christine Cotton, Malcolm Pirnie. Desired outcome of presentation: To help utilities evaluate UV disinfection as a future alternative by being more familiar with UV disinfection requirements and guidance.

8:45 am Bromate Formation Control by Chlorine Dioxide and Comparison with Several Other Control Technique at a Full Scale Water Treatment

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AWWA Conference
October 14-17, 2002
Victor Valley Water District's General Manager has a presentation at the conference

Bringing Water to Life

The Water Resource

September 2002

We encourage residents to attend meetings of the Board of Directors to learn more about how we obtain, treat, and deliver your water.

The Board meets the first and third Tuesday of each month at 6 p.m. at the District office at 17185 Yuma Street.

You also may wish to attend special meetings about specific issues. Here are tentative dates for these meetings:

- *Conservation*
  November 6, 2002
- *Strategic Planning*
  February 11-12, 2003
- *Water Rates*
  March 25, 2003
- *Budget*
  May 27, 2003

Dates may change, so call the District office at 245-6424 to confirm, or visit our website at vvwater.org.

Service Everyday and Around-the-Clock

Water service is so reliable that you rarely have cause to think about it. You can turn on your tap anytime, day or night, and plenty of high-quality water flows out.

Team of Water Professionals

Providing nearly flawless round-the-clock service is possible due to the daily cooperative efforts by the Victor Valley Water District's team of water professionals. Every time you turn on the tap, you're seeing—and using—the result of that team effort.

Falling Groundwater Levels Strain the System

Water demand continues to grow as our community grows. As a result, our groundwater table has been falling, making our job more challenging. Through teamwork, District employees are meeting your needs today, and they're planning for the future.

We Are Here to Serve

We have put together individual talents, abilities, and diverse backgrounds to serve you. Meeting the community's water needs is a challenge that we welcome.